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A SUGGESTION OF A WAY TO FORWARD OUR KNOWLEDGE OF THE ASTEROIDS.

By Reinhold Schmidt, Zoerbig, Germany.

[Reprinted by special request of the author.*]

The year 1890 is likely to mark quite an important departure in the history of asteroidal discoveries, and in one sense, unfortunately, a departure not for the better.

As announced in the astronomical almanac of the Imperial Observatory of Vienna for 1890, the great number of the already known asteroids, and, more than that, their rapid increase, have made it an impossibility for the Berlin Computing Bureau to keep up the constant work of furnishing the necessary data for the small planets, for upon this institution the duty of doing this exhaustive work has thus far depended. For a number of years past, accurate ephemerides have been limited to the newly-discovered asteroids and to those whose orbits are still affected by a considerable uncertainty, in order to facilitate the observations still required for a correction of their elements. Of the older and better known asteroids, however, only very rough ephemerides have been given, simply for the purpose of enabling one to decide whether a movable body attracting our attention be a planet already known or a new one; but an accurate calculation of the perturbations to which they are subjected, and a correction of their orbital elements by later observations has been omitted. The result is naturally this, that, with a few exceptions, we do not at the present time know the orbit of any asteroid with such accuracy as the state of science demands — with such precision as would allow us to carry on theoretical investigations, such as, for instance, the determination of Jupiter's mass, etc. To put an end to this very unsatisfactory condition of affairs, the editors of the *Berliner Jahrbuch* have concluded to begin, first of all, a more thorough treatment of the existing material for such planets as, for theoretical or other reasons, are of particular interest, while the remaining ones, and the later discoveries, will be considered only in so far as they may be of value for other important astronomical investigations. According to these principles predictions will be furnished, from this time on, only for such asteroids as:

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* English translation from *Die Natur* (April 1890), by Otto von Geldern.

(1) Approach near the earth, and are, therefore, particularly adapted to determinations of parallax;

(2) Approach near to *Jupiter*, and are useful for determining its mass;

(3) Are remarkable for a period having a closely commensurable ratio to that of *Jupiter;* it being known that such orbits are of the greatest importance in the theory of absolute perturbations;

(4) Attain considerable brightness, and are, therefore, of value in photometric work.

If, in the future, the computations are limited to this category of asteroids, it will probably be possible for the next two or three years only to tell with absolute certainty whether a newly discovered moving star be a planet already known or an unknown one; but later on, when the number of these incompletely determined asteroids shall have reached several dozens, it will be simply impossible.

If these conditions remain as stated by the authority here quoted, it is evident that research in the field of planetoidal discoveries will have received its death-blow. For what discoverer would be willing to take the trouble and spend the time in searching for asteroids, if in case of a discovery he would not be able to tell whether he had found a new body or not? The present discoverers would, in the nature of things, turn to other fields of astronomical labor, or would limit themselves to observations upon those asteroids falling within the four groups mentioned, occasionally looking up one of the other now known and completed planetoids for a general control.

But this would undoubtedly be a step backward, and greatly to be regretted. Every planetoidal discovery, even if of no other value, increases our knowledge of the solar system, and from the mere number and their existence—that is, from the statistics of the known asteroids—very important conclusions have already been drawn. Posterity would find it difficult to understand why the discovery of asteroids should cease at the end of the nineteenth century, when the optical means are still adequate for a long time to come, and the powers of a PALISA, PETERS, LUTHER, CHARLOIS, and others, are still available for such a service; when there is no other reason for the interruption of this work than that the computer failed to furnish the necessary calculations.

Against the Berlin Computing Bureau, as far as it concerns that institution, nothing can be said, for the curtailment announced in this work had become an absolute necessity. And, aside from this, it is to be noted with satisfaction that, in certain directions, a deeper knowledge of the asteroids, etc., will be gained by this decision. But would it not be possible to take up this constantly required work in other quarters according to the principle of a division of labor?

In the old world it is more than likely that all larger astronomical institutes have their set plan of work for years and decades to come, to which such a considerable amount of extra and continuous labor could not well be added. Involuntarily we turn our face to North America, where new and extensive astronomical institutions, generously endowed with instruments, money and assistants, are constantly created. *Could not one of these make it a special object to furnish regular computations, accurate enough for all purposes of the discoverer at least, of those planetoids that are now left unconsidered in Berlin, and to publish them in almanacs, etc., for coming years?* It would seem as though this were a good work of considerable importance — a work which would meet with greater approval by many than, for instance, the effort to eclipse the gigantic telescopes of the day by the creation of a still larger one. At all events, the idea may deserve the attention of those interested on "the other side."

ON THE PHOTOGRAPHS OF THE MILKY WAY MADE AT THE LICK OBSERVATORY IN 1889.

By E. E. Barnard.

It seems desirable to give a brief description of the photographs of the Milky Way made by me at the Lick Observatory in 1889, and to call attention to their special and important points which might otherwise be overlooked by those not familiar with celestial photography, and thus their value be under-estimated for the purpose for which they were made. It was intended to show, as far as possible by photography, the wonderful and complex structure of the Milky Way.

One very important feature, and one which must not be overlooked, is that these are the only photographs ever made, here or elsewhere, which show at all the true Milky Way.

The structure of the Milky Way is invisible in the telescope because of the limited field of view; for we see, comparatively, only a few of the individual stars whose combined light illuminates the sky and aids in giving the clouded appearance which is so conspicuous